

A Description of the hitherto undescribed Tadpole of, and some Field Notes on the Fungoid Frog, *Rana malabarica* Bibron

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(With one plate)

During the 1957 monsoon, while collecting zoological material from rain-water pools in the Krishnagiri National Park, Borivli, Salsette Island, Bombay, I obtained a tadpole in its 4-limbed stage which looked quite different from those already known from this locality. It was taken in a dip-net from a pool on the west of Gandhi Smarak Mandir Hill, close to a culvert on the road to the Kanheri caves. At the same time I also took tadpoles of *Rana cyanophlyctis* Schneider, the fishes *Rashora daniconius* (Hamilton), *Puntius ticto* Hamilton, and *Channa gachua* (Bloch), and a few dragon-fly larvae.

The flat flesh-coloured dorsum, the dark brown flanks, the conspicuous dark band extending from snout to hind-limb, the alternately arranged prominent light and dark transverse bands on the limbs, and the characteristic digits were all strongly suggestive of the specimen being an early stage of the Fungoid Frog, *Rana malabarica* Bibron.

Efforts to obtain some more specimens of this tadpole on the same day were in vain. Three subsequent collections, made on 1, 6, and 8 September 1957, were productive of fifty specimens including some in the 4-limbed stage. The only other pool which yielded this tadpole was one also adjoining the road to the Kanheri Caves and situated on the southern side of the Gandhi Smarak Mandir Hill about half-a-mile away from the first pool.

Eight of the tadpoles collected on 1 September were reared at the Natural History Section, Prince of Wales Museum of Western

India, Bombay, three of which developed into the juvenile frogs of *Rana malabarica* Bibron now in the collections of the Bombay Natural History Society. The rest died at different stages of metamorphosis.

The description of the tadpole of *Rana malabarica* Bibron recorded by Boulenger (1920) in 'A Monograph of the South Asian, Papuan, Melanesian and Australian Frogs of the Genus *Rana*' (*Rec. Ind. Mus.* 20 : 100), based on the tadpoles collected by Mr. Kemp from Talewadi, near Castle Rock, North Kanara, and identified as of this species by Dr. Annandale (*ibid.*) differs greatly from the specimens collected in Borivli, whose identity is not in doubt.

The Talewadi tadpoles (*vide* Boulenger's description) differ from the Borivli tadpoles as under:

Talewadi Tadpoles

1. Large, overall length 70 mm.
2. Tail $1\frac{1}{4}$ to $1\frac{3}{4}$ times the length of head and body; the crest on tail not extending on to the back.
3. Horny teeth in eight upper series, the two outer continuous, the others gradually decreasing in length; six or seven lower series, the innermost narrowly interrupted, the others continuous.

Borivli Tadpoles

- Medium-sized, the largest being 48 mm.
- Tail nearly twice the length of head and body; the crest extending slightly on to the back.
- Horny teeth in one upper series; commonly two lower series; of which the inner row is interrupted in the middle, rarely a short 3rd outermost row.

Four of the Talewadi tadpoles (Z.S.I. No. 18270) were examined by courtesy of the Director, Zoological Survey of India, Calcutta. They were found close to Rao's (1919) description of the tadpoles of *Rana curtipes* Jerdon. They also compare well with the four tadpoles of this species in the collections of the Bombay Natural History Society, Bombay, obtained by Mr. Humayun Abdulali from the Kali-Nadi, Dandeli, North Kanara District, Bombay (now Mysore), during Christmas 1951, B.N.H.S. Amphibian Collection No. 256.

Apart from these important structural differences, the respective colours of these two tadpoles in life are quite different. The Talewadi tadpoles were said to have been of 'black colour above and beneath', whereas those from Borivli are straw-yellow. There can, I think, be no doubt that the Talewadi specimens and Boulenger's description refer to *Rana curtipes* Jerdon and not to *Rana malabarica* Bibron leaving the latter tadpoles undescribed. I am, therefore, giving a description of the tadpole of *Rana malabarica* Bibron;

Description of tadpole of *Rana malabarica* Bibron

Head and Body: Oval, the broader end being towards anus; snout bluntly pointed and declivous; eyes dorsal, prominent; nostrils, black and inconspicuous, nearer the tip of the snout than the eye; dorsum flat.

Mouth-disc: Fairly big and sucker-like, ventral in position; roughly spherical in shape, with a pointed emargination on either side; the margin of the upper lip fringed with horny teeth and devoid of papillae; the lower lip with two rows of horny teeth, the first row interrupted and the second complete: rarely an additional ill-developed third row, in which case the second row has a small concavity just in the middle of its course into which the small third row fits (6 of 50 examined had this character); papillae lining the margin of the lower lip of the mouth-disc extend laterally up to the upper lip on either side of the mouth-disc, and are continuous with the row of teeth fringing its margin; dental formula $1/1+1:1$ rarely $1/1+1:2$; the upper beak crescentic; lower broadly V-shaped; margins of both finely serrated.

Tail: Nearly twice the length of head and body, tapering gradually and sharply pointed; the fin-membranes well developed both dorsally and ventrally and relatively broad, the upper commencing dorsally from the posterior part of the body slightly above the origin of the tail.

Spiracle: Tubular in shape, located laterally roughly at mid-body on the left.

Anus: Prominently tubular; extending to nearly $\frac{1}{8}$ of the tail, directed to the right.

Colour: General colour straw-yellow. Head and body blotched with brownish black, and the ventral surface whitish; nostril black; pupil black; iris golden yellow; spiracle whitish; tail straw-yellow with light speckling of black; upper beak black; lower generally white, rarely pearly-white with grey blotches, and margin black; a dark line commences at the nostril and continues backwards through the eye and along the side of the body on either side to the base of the tail in the four-limbed stage; hind limbs prominently barred transversely and alternately in black and white; fore limbs also similarly barred but less strikingly.

Field Notes: Both the pools from which the tadpoles were obtained were open and not shaded by trees or shrubbery. The water was ankle- to knee-deep, with a muddy bottom, and there was a

profuse growth of weeds, grass, and other monsoon-vegetation in and around the pools.

TABLE

Measurements of 11 specimens of *Rana malabarica* Bibron in various stages of development

	1	2	3	4	5	6	7	8	9	10	11
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Total length	.. 26	35	38	41	44	48	46	36	32	23	19
Length of head and body	.. 9	13	14	15	16	16	15	20	20	17	16
Breadth of head and body	.. 5	7	8	8	9	9	9	10	8	7	6.5
Depth of body	.. 5	5	6	6	8	7	8	8	8	6	4
Greatest depth of tail	.. 6	7	8	7	9	7	10	6	4	3	No tail

Note: No. 6 with well-developed hind limbs; Nos. 7, 8, 9, and 10 in the 4-limbed stage; and No. 11 a juvenile frog.

It was interesting to note that the tadpoles in both the pools were always found in company with those of *Rana cyanophlyctis* Schneider, as every scoop of the net invariably brought out a small mixture of both the species. *Rana malabarica* Bibron is ordinarily solitary. It may be worthwhile drawing attention to the fact that, though the frog is most often seen in rocky cisterns (but outside water) in the caves, forts, etc. in the hills around Bombay, the tadpoles were taken in an open pool with a muddy bottom at sea-level.

Laboratory Notes: It took two months and eighteen days for the tadpoles to grow into juvenile frogs, of which the last one died on 18 November 1957, probably for want of suitable live insect-food, while the others died at various stages of development. Under natural and more congenial conditions the period of development will perhaps differ.

Every attempt was made to afford the tadpoles as much natural environment as possible, including mud and weeds from the original pools. They were fed on minced meat.

These studies were carried out together with Dr. E. G. Silas, then Registrar of the Bombay Natural History Society, and I would like to record my gratitude for his assistance and co-operation.

In view of the paucity of field notes regarding this species, I am gratefully accepting Mr. Humayun Abdulali's offer to append his personal notes (unpublished), which he has supplemented with those of Mr. Charles McCann (*J. Bombay nat. Hist. Soc.* 36 : 168-169). Mr. Humayun Abdulali writes:

'Some specimens which I obtained on the Kasara Ghat near Igatpuri, Nasik District, and others in the Society's collection from Cannanore and Nelambur, in Malabar District, appear to represent the northern and southern limits of this species. McCann recorded it as fairly common in Bombay and Salsette Islands, generally in forested areas but occasionally in open country. He continued: "It is terrestrial and semi-arboreal in habit, and is frequently found perched high up on the bark of trees and on the leaves of bushes. In all probability it is a diurnal species as I have often come across it during the day, but have so far not found it about at night."

'In the dry weather (January, March, and April) they may be found in the stone cisterns at the Kanheri and other caves near Bombay, usually on the hills between 1000 and 2000 feet. They were noted on the wet soil or on the rocks and in crevices in the walls of the cistern but never inside the water. I have not seen it on trees but it does occur occasionally in the low country. The animal is not gregarious and is usually seen singly—though on 30 March 1956 more than 20 were seen together in one cistern. It is not at all shy and can be easily captured. One handled at Tansa Lake in September 1943 produced a smell like that of burnt rubber but this experience was never repeated.

'Jerdon in the *Journal of the Asiatic Society of Bengal*, 1853, p. 531, wrote: "Found only on the West Coast and chiefly during the monsoons when it enters houses and makes a gobbling so much like a turkey that some people call it the Turkey Frog." McCann says: "when handled it utters a call not unlike the mew of a cat as also a sort of high-pitched *kut, kut*, repeated several times". A very distinctive *wuck, wuck, wuck* in changing tones and notes heard at night have been traced to this frog sitting at the edge of a small rain-pool and shaded by mango trees. The pool held many skipper frogs (*Rana cyanophlyctis*). On another occasion the call was traced to an individual seated on the edge of a rock quarry and I have subsequently often heard this call by the side of pools in the low country, always at night.

'On the night of 24 June 1954 a female loaded with eggs, each half white and half black, was taken in one of the cisterns at Kanheri, but

in spite of periodic examinations no spawn or tadpoles were found in the rock cisterns, where several other species are known to breed. It would appear that the rock cisterns are frequented only for moisture and that the breeding takes place in pools in open country.

Two large and four small individuals were taken from the congregation seen on 30 March—the two large ones were females while the others were of both sexes. In all the organs were dormant, the large female contained reddish fat bodies on the stomach.

The stomachs of small specimens examined held remains of dragonflies (?), while a large one taken at Kanheri contained the remains of *Rana leithii*. The female loaded with eggs referred to earlier contained four large centipedes.